![Juniper Networks logo]

E320 AND E120 BROADBAND SERVICES ROUTER PORTFOLIO

Product Overview

Broadband operators face many challenges as they offer increasingly complex bundles of multiplay services. The Juniper Networks Broadband Services Router (BSR) portfolio provides the advanced subscriber management, high-performance routing, efficient Ethernet aggregation, and superior quality of service that address diverse broadband network edge requirements with unprecedented capacity, reliability and performance.

Product Description

Our BSR portfolio consists of the Juniper Networks® E320 and E120 Broadband Services Routers. Introduced in 2005, the award-winning E320 BSR provides the high system capacity as well as the high subscriber and interface density required for large broadband deployments. The E120 BSR, introduced in 2007, provides the same comprehensive feature set as the E320 in a platform designed for smaller configurations. Both platforms uniquely combine advanced hardware and software that support service provider efforts to reduce operations costs and drive new revenue opportunities via advanced services that include bundled voice and Internet access, virtual private networks (VPNs), IPTV, gaming, and streaming music applications.

The E320 and E120 share a common system architecture that distributes packet processing and quality of service (QoS) policy enforcement functions to ASIC-based line modules. This design provides a fast path for IP traffic streams by removing the route processor from the forwarding path, and ensures performance at scale by incrementally adding processing power as new subscribers and services are provisioned.

The E320 and E120 also share a modular, carrier-class design with optional redundancy on all major hardware subsystems and common equipment—including switch fabric, route processing, and packet processing redundancy—as well as interface card and interface-level protection schemes. Furthermore, both platforms are powered by the Juniper Networks JUNOSe™ software. The modular, object-oriented, and component-based architecture of the production-hardened JUNOSe increases overall system reliability, simplifies upgrades, and accelerates new feature development.

Together with JUNOSe, the E320 and E120 incorporate the vast experience Juniper has gained over many years of supporting service providers worldwide, and provide a comprehensive solution for the profitable deployment of services to residential and business customers alike.

Architecture and Key Components

The E320 BSR is a high-performance routing platform optimized for large point of presence (POP) environments and multiplay service delivery. Service providers can optionally equip their E320 with either a 100 Gbps or a 320 Gbps switch fabric.
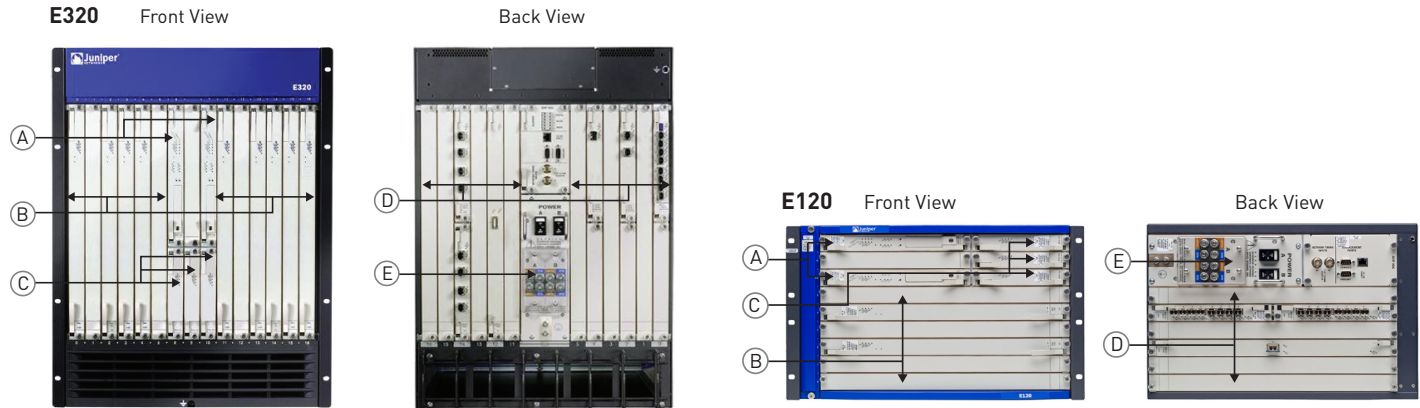
The E120 BSR, with its 120 Gbps switch fabric, is a high-performance routing platform optimized for smaller POPs and central offices and multiplay service delivery.

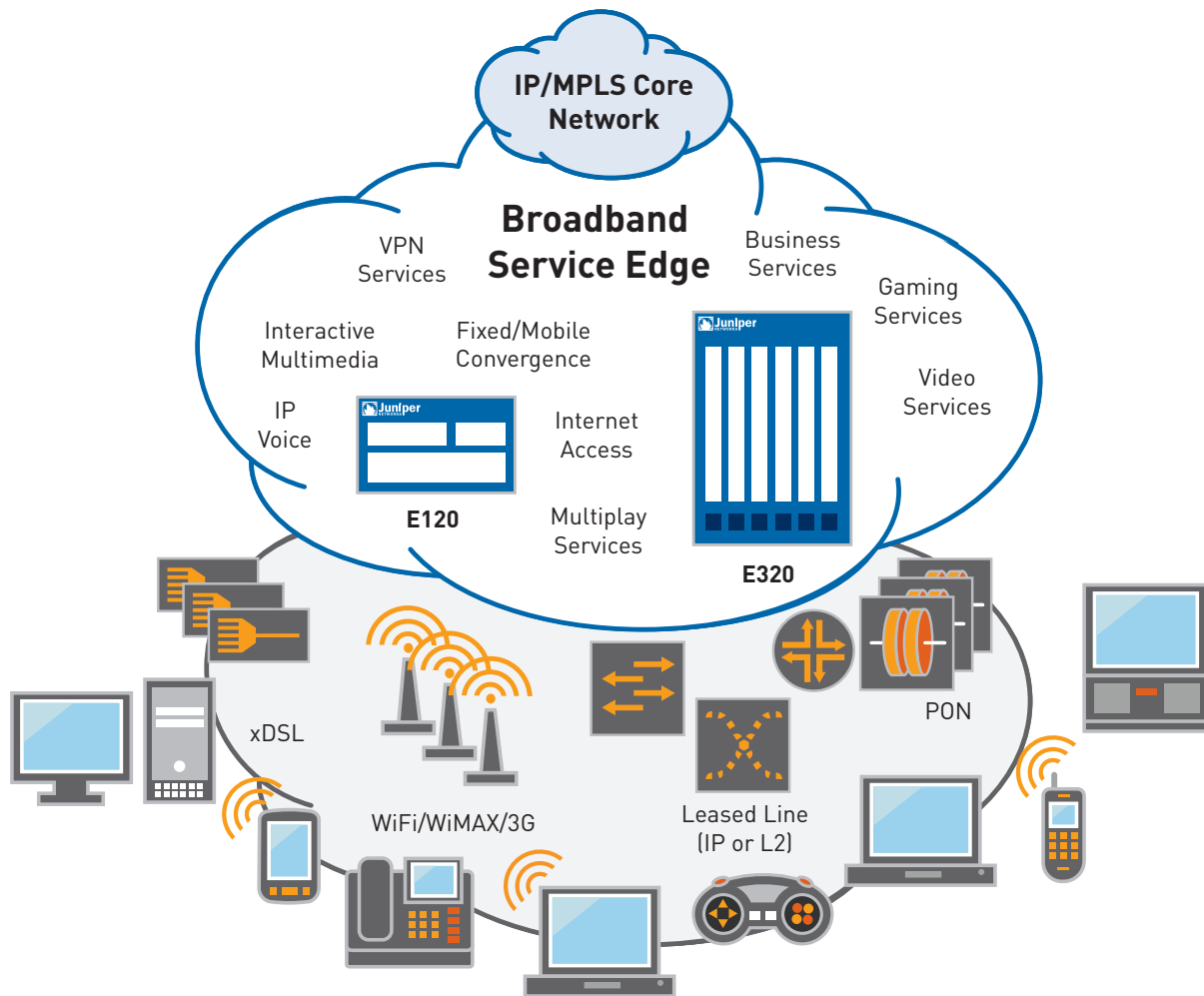The E320 and the E120 share a system architecture and common components:

- Switch route processors (SRPs) perform system management, routing table calculations maintenance, forwarding table computations, and other control plane functions.

- Switch fabric modules (SFMs) create a distributed shared memory switching fabric.

- Line modules (LMs) are frame processing and forwarding engines for I/O modules.

- Power modules distribute redundant power feeds through the system to all components.

- I/O adapter modules provide the physical connection to the network via 10-Gigabit Ethernet, Ethernet, Asynchronous Transfer Mode (ATM), and Packet over SONET (POS) interfaces.

The placement of these system components are as shown.

E320 Front View   Back View

E120 Front View   Back View

E320 BSR and E120 BSR components (A: SRP, B: LM, C: SFM, D: I/O adapter, E: power)

IP/MPLS Core Network

Broadband Service Edge

VPN Services

Business Services

Gaming Services

Interactive Multimedia

Fixed/Mobile Convergence

Video Services

IP Voice

Internet Access

E120

Multiplay Services

E320

xDSL

WiFi/WiMAX/3G

Leased Line (IP or L2)

PON

E320 and E120 BSRApplications – With industry leading scale andflexibility, the Juniper Networks BSRportfolio underpins video, voice, and data service delivery, to both residential and business broadband customers.

Features and Benefits

The E320 and E120, together with JUNOSe, extend many economic and performance related benefits.

FEATURES	FEATURE DESCRIPTION	BENEFITS
Flexible high capacity	The E320 BSR supports a 100 Gbps or a 320 Gbps switch fabric (40 M-180 Mpps performance).	Reduces operating and capital expenses: aggregates more subscribers and services.
Environmental efficiency	The E120 BSR has a small form factor and reduced power budget for operation in smaller POPs/central offices.	Extends market reach: the E120 extends high BSR performance to smaller POPs/COs without sacrificing features or reliability.
Carrier grade operating system	JUNOSe is the production-hardened E-series portfolio OS.	Reduces operating expenses: increases reliable operation.
Operational consistency	The E320 and E120 share common components and JUNOSe software.	Reduces operating expenses: ensures consistent network operations and simplifies sparing.
High Ethernet density	Both the E320 and E120 support high-density Gigabit Ethernet and 10-Gigabit Ethernet configurations.	Reduces operating and capital expenditures: flexibly permits both aggregation and "direct connect" models.
Line rate forwarding using Juniper's custom ASICs	Hardware-based forwarding, with separate processors for routing and forwarding tasks.	Improves performance: ensures high performance for multiplay services, at carrier scale.
Sophisticated QoS feature set	Features include hierarchical queuing and scheduling, rate-limiting for individual queues and logical/physical interfaces.	Assures quality of experience: supports quality multiplay services to both residential and business consumers.
High Availability	All major hardware subsystems and common equipment can be redundantly configured, while JUNOSe is a carrier-grade OS.	Improves customer satisfaction: the combination of dependable hardware and reliable software delivers "always-on" services.
Access layer agnostic	Connects xDSL, FTTx, and wireless access networks to the IP/MPLS network.	Supports a broad set of business and residential applications.
ATM to Ethernet migration	Concurrent support for ATM and Ethernet based interfaces.	Operational savings: maintains operational and feature consistency during transition.
Integrated with Juniper Networks SRC Series Session and Resource Control Modules	Provides policy-based management of the network infrastructure.	Reduces operating and capital expenditures: intelligently automates network utilization.

E320 Broadband Services Router

E120 Broadband Services Router

Specifications

For a complete list of E320 and E120 specifications and certifications, please consult the E Series technical documentation at http://www.juniper.net/techpubs/hardware/e-series.html.

		E120	E320
Dimensions and Power			
Weight	Chassis only	51 lb (23.18 kg)	88 lb (39.9 kg)
	Fully configured	107 lb (48.63 kg)	~215 lb (97.5 kg)
Dimensions (W x H x D)	Chassis only	17.45 x 11.25 x 25 in (44.32 x 28.58 x 63.5 cm)	19 x 24.5 x 25 in (48.26 x 62.23 x 63.5 cm)
	Chassis with cable management bracket and bezels	17.45 x 11.25 x 25 in (44.32 x 28.58 x 71.12 cm)	19 x 24.5 x 28 in (48.26 x 62.23 x 71.12 cm)
Environmental requirements		Network Equipment Building System (NEBS) GR-63-CORE compliant	
Ambient operating temperature		Long-term: -41 to 104° F (5 to 40° C) Short-term: 23 to 122° F (-5 to 50° C)	
Ambient operating humidity		Long-term: 5 to 85% (noncondensing) Short-term: 5 to 95% (noncondensing)	
Power		Voltage: -40 to -72 VDC Current: 60 A @ -48 VDC Power: 2170 W @ -48 VDC	Voltage: -40 to -72 VDC Current: 80 A @ -48 VDC Power: 3840 W @ -48 VDC (320 G) Power: 2289 W @ -48 VDC (100 G)
NEBS Certification	• SR-3580 (FD-15): NEBS Criteria Levels, Issue 1, November 1995 • GR-63 (LSSGR, FD-15): NEBS Requirements: Physical Protection, Issue 1, October 1995 • GR-1089 (LSSGR, FD-15): Electromagnetic Compatibility and Electrical Safety—Generic Criteria for Network Telecommunications Equipment, Issue 2, Rev1, 2/99		
Safety Agency Certification, Information Technology Equipment	• AS/NZS 3260: 1993, Safety of Information Technology Equipment Including Electrical Business Equipment • CAN/CSA C22.2, No. 60950-00, 3rd Edition, Safety of IT Equipment • EN60825-1, Safety of Laser Products—Part 1: Equipment Class, Requirements, and User's Guide (2001) • EN60950:2000, 3rd Edition, Safety of Information Technology Equipment • IEC 60950-1(2001-10) Ed. 1.0 IT Equipment Safety Part 1: General Requirements • Low Voltage Directive (73/23/EEC)		
Electromagnetic Emissions Agency Certification	• AS/NZS 3548:1995 (CISPR 22 Class A) • EMC Directive (89/336/EEC) • EN55022 Class A (CISPR-22 Class A) • EN55024, Annex C for WAN Equipment Performance, Criteria A, B, and C • ETSI 300-386, Telecommunication Network Equipment, EMC requirements • FCC Part 15 Class A • IECS-003 Issue 3 Class A • VCCI (Voluntary Control Council for Interference by Information Technology Equipment) Telecommunications Certification • ACA TS 016-1997 • CTR13Commission Decision of 9/9/97 on a common technical regulation for attachment requirements for terminal equipment interface for connection to 2048 kbit/s digital structured ONP leased lines: 97/521/EC – OJ No. L215 Vol. 40, 10/97 • CTR24 – Commission Decision of 9 September 1997 on a common technical regulation for attachment requirements for terminal equipment interface for connection to 34Mbit/s digital unstructured and structured leased lines: 97/639/EC – OJ No. L271 Vol. 40, 3 October 1997 • FCC PART 68 • IECS-003 Issue 3 Class A • PD7024 – Essential requirements for terminal equipment intended for connection to unstructured digital leased circuits of the public telecommunications network using a CCITT recommendation G.703 interface at a rate of 2048 kbit/s with a 75 ohm unbalanced presentation, 1994 • RTTE Directive (1999/5/EEC)		

Performance-Enabling Services and Support

Juniper Networks is the leader in performance-enabling services and support, which are designed to accelerate, extend, and optimize your high-performance network. Our services allow you to bring revenue-generating capabilities online faster so you can realize bigger productivity gains, faster rollouts of new business models and ventures, and greater market reach, while generating higher levels of customer satisfaction. At the same time, Juniper Networks ensures operational excellence by optimizing your network to maintain required levels of performance, reliability, and availability. For more details, please visit www.juniper.net/products-services.

Ordering Information

Switch Fabric Options

FEATURE	E120 OPTIONS	E320 OPTIONS
Switch fabric capacity	120 Gbps	100 Gbps or 320 Gbps
Switch fabric modules	SFM-120 SFM-320*	SFM-100 SFM-320
Switch route processor modules	SRP-120 SRP-320*	SRP-100 SRP-320

Line Module Options

LINE MODULE	PART NUMBER	DESCRIPTION
4 Gbps Line Module	ES2 4G LM	4 Gbps processing capacity for all I/O adapter types
10 Gbps Line Modules	ES2 10G-U LM ES2 10G-A LM	• 10 Gbps processing for 10-Gigabit Ethernet I/O adapter only • 10 Gbps processing for Gigabit Ethernet and 10-Gigabit Ethernet I/O adapters

Density Maximums

TECHNOLOGY	PART NUMBER	DESCRIPTION	MAX PORTS, E120	MAX PORTS, E320
10-Gigabit Ethernet	120 ES2-S1 10GE IOA	1x10-Gigabit Ethernet	6	12
Gigabit Ethernet	ES2-S1 GE-4 IOA ES2-S1 GE-8 IOA	4xGigabit Ethernet 8x Gigabit Ethernet	24 96	48 192
OC3/STM1	ES2-S1 OC3-8/ STM1 IOA	8xOC3/STM1 (ATM only)	96	192
OC12/STM4	ES2-S1 OC12-2/ STM4 IOA	2xOC12/STM4 (ATM/POS)	24	48
OC48/STM16	ES2-S1 OC48-2/ STM16 IOA	1xOC48/STM16 (POS)	6	12

*The E120 supports a maximum of 120 Gbps capacity per system, independent of the SFM and SRP used.

MODEL NUMBER	MODEL NAME AND DESCRIPTION
E320 and E120 Base System Options	
ES2-BSLM6-SYS	6-slot E120 chassis
ES2-BSLM12-SYS	12-slot E320 chassis
E320 and E120 SFM and SRP Options	
ES2-100G-SFM	100 G SFM for the E320 only.
ES2-100G-SRP	100 G SRP for the E320 only.
ES2-120G-SFM	120 G SFM for the E120 only.
ES2-120G-SRP	120 G SRP for the E120 only.
ES2-320G-SFM	320 G SFM; supported in the E320 and E120.
ES2-320G-SRP	320 G SRP; supported in the E320 and E120.
E320 and E120 LM Options	
ES2-10GACS3-MOD	10 G access line module (LM10A)
ES2-10GUPS2-MOD	10 G uplink line module (LM10U)
ES2-4GS1-MOD	4 G line module (LM4)
E320 and E120 Service Module	
ES2-SERVS1-IOA	Supports highly scalable L2TP LNS and GRE tunnels, as well as Network Address Translation (NAT) and Firewall Services.
E320 and E120 IOA Options	
ES2-10GES1-IOA	Provides a single 10 Gigabit Ethernet port via an XFP interface.
ES2-10GES2-IOA	Provides two 10 Gigabit Ethernet ports (1-active, 1-standby) via XFP interfaces.
ES2-2OC12AS1-IOA	Provides two OC12/STM4 ATM ports via SFP interfaces in a half-slot form factor.
ES2-2OC12PS1-IOA	Provides two OC12/STM4 POS ports via SFP interfaces in a half-slot form factor.
ES2-8OC3AS1-IOA	Provides eight OC3/STM1 ATM ports via SFP interfaces in a half-slot form factor.
ES2-GE20S3-IOA	Provides 20 Gigabit Ethernet ports via SFP interfaces in a half-slot form factor.
ES2-GE8S1-IOA	Provides eight Gigabit Ethernet ports via SFP interfaces in a half-slot form factor.
ES2-OC48PS1-IOA	Provides a single OC48/STM16 POS port via SFP interfaces in a half-slot form factor.
ES2-GE4S1-IOA	Provides four Gigabit Ethernet ports via SFP interfaces.

About Juniper Networks

Juniper Networks, Inc. is the leader in high-performance networking. Juniper offers a high-performance network infrastructure that creates a responsive and trusted environment for accelerating the deployment of services and applications over a single network. This fuels high-performance businesses. Additional information can be found at **www.juniper.net**.

To purchase Juniper Networks solutions, please contact your Juniper Networks representative at **1-866-298-6428** or authorized reseller.

1000103-001-EN   Feb 2009

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